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ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMM--ETC F/G 13/6
FORKLIFT TRUCK, 4000-POUND-CAPACITY, GASOLINE-ENGINE-DRIVEN, 50--ETC(U)
MAR 82 J E STEPHENS, W P CUNIFFE

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FORKLIFT TRUCK, 4000-POUND-CAPACITY, GASOLINE-
ENGINE-DRIVEN, SOLID-RUBBER-TIRED, ALLIS-CHALMERS
MODEL ACC 45 NSN 3930-01-075-4937 - ARMY USER SURVEY

by
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and
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March 1982

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U.S. ARMY MOBILITY EQUIPMENT
RESEARCH AND DEVELOPMENT COMMAND
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in.	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in. ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
tbsp	tablespoons	15	milliliters	ml
in. ³	cubic inches	16	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	degrees Fahrenheit	5.9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions
from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in.
cm	centimeters	0.4	inches	in.
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in. ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in. ³
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F

FORKLIFT TRUCK, 4000-POUND-CAPACITY, GASOLINE-ENGINE-DRIVEN,

SOLID-RUBBER-TIRED, ALLIS-CHALMERS MODEL ACC 45,

NSN 3930-01-075-4937 – ARMY USER SURVEY

I. INTRODUCTION

1. Objective. This report covers surveys to determine the acceptability of the Forklift Truck, 4000-Pound-Capacity, Gasoline-Engine-Driven, Solid-Rubber-Tired, Model ACC 45, NSN 3930-01-075-4937 to the Army users.

2. Background. These forklifts represent the Army's first procurement of commercial materials-handling equipment under directives issued by the Office of Management and Budget¹ to procure off-the-shelf commercial items in lieu of military-designed and military adaptations of commercial items.

The commercial forklifts which are the subject of this report were procured as the final step in a five-step process. The five steps are:

- Survey Commercial Manufacturers.²
- Survey Commercial Users.³
- Prepare Technical Data Package.⁴
- Two-Step Procurement.
- Award of Contract.

MERADCOM performed surveys of commercial manufacturers and of commercial users of this forklift at their facilities. A variety of industrial operations were covered in the user survey. The survey concluded that the users of this forklift considered it highly acceptable, and given the opportunity they would repurchase the same item. However, attempts to obtain empirical data to objectively assess reliability, availability, and maintainability characteristics of this forklift were unsuccessful because the commercial users

¹ Office of Management and Budget Directive, Subject: "Procurement and Supply of Commercial Products," 24 May 1976.

² Stephens, James E., Jr. and Reid, Jesse W., Jr., "FORKLIFT TRUCKS, GASOLINE-ENGINE-DRIVEN, 4000- TO 6000-POUND-CAPACITY – MANUFACTURER SURVEY," MERADCOM Report 2231, February 1978.

³ Stephens, James E., Jr. and Reid, Jesse W., Jr., "FORKLIFT TRUCKS, GASOLINE-ENGINE-DRIVEN, 4000-POUND TO 6000-POUND-CAPACITY – USER SURVEY," MERADCOM Report 2230, February 1978.

⁴ Military Specification, MIL-T-52932 (ME), "Truck, Lift, Fork, Gasoline-Engine-Driven, 4000-6000 Lb Capacity, General Specification for," 24 August 1977.

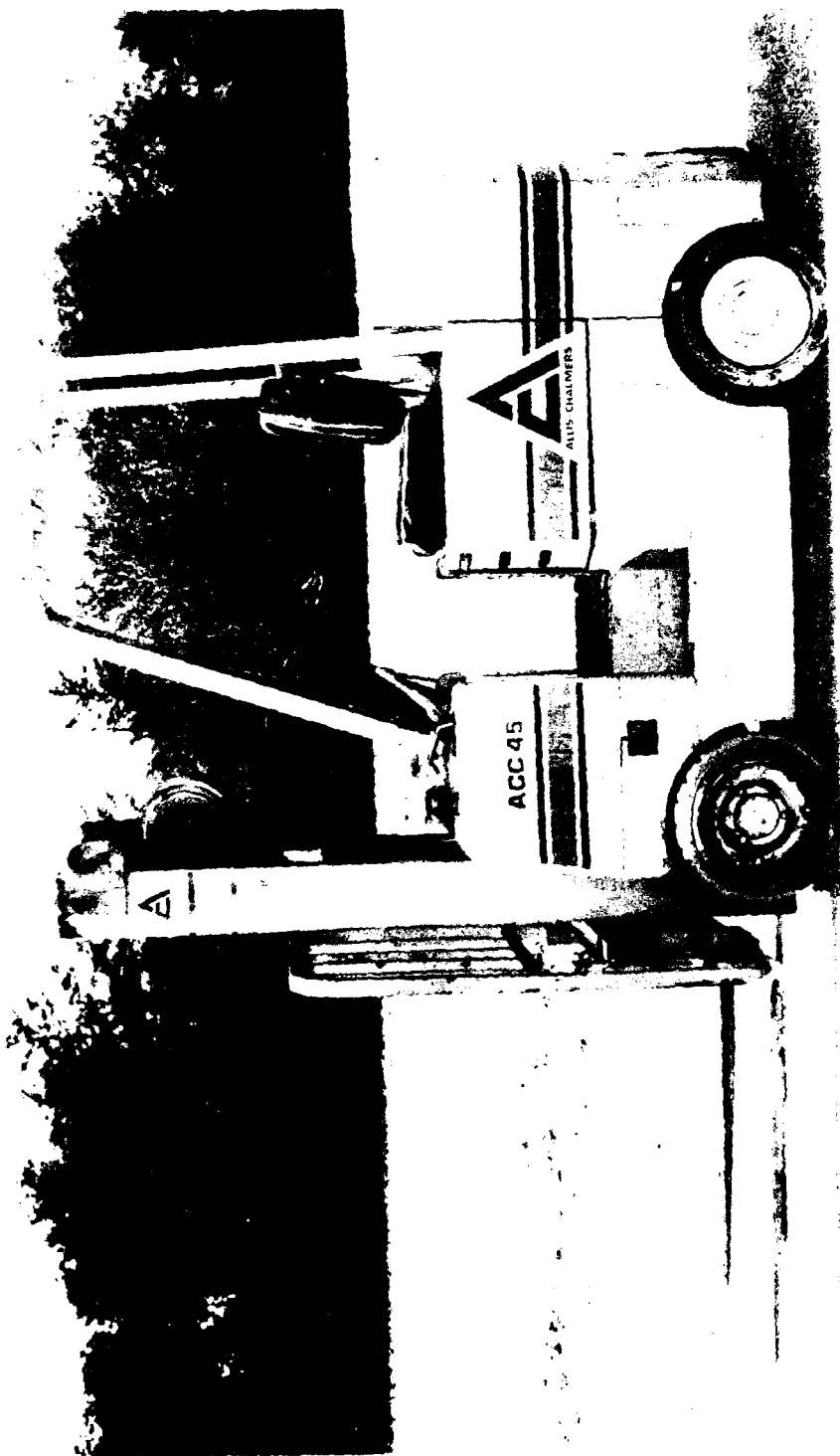
had not logged these data consistently. Some users lease their equipment with maintenance supplied as part of the lease agreement, and these users have little incentive to log maintenance data. As the final step in the five-step process outlined above, a contract was awarded to the Allis-Chalmers Corporation, Industrial Truck Division, Matteson, Illinois, on 29 September 1977. The contract, DLA700-78-C-8339, was for 90 units at a total cost of \$971,205.00. The individual unit cost was \$10,791.00. A photograph of the contract item is shown on the following page; its salient features versus the specification requirements are given in Table 1. Note that the specification did not have a noise requirement; this has since been corrected. The commercial brochure for the ACC 45 is presented as Appendix A.

II. INVESTIGATION

3. **Phases.** The investigation was segmented into three distinct phases. First was identifying the Army users to be surveyed, then preparing the survey questionnaires, and finally the on-site surveys of the selected Army users.

4. **Identifying the Army User.** The U.S. Army Tank and Automotive Command's Item Manager for this item identified all of the users to which these forklifts had been issued. The item manager also provided the quantities of forklifts issued to each individual user. The criteria used to select candidate Army users for survey was that they should have been issued a minimum of four of these forklifts. This minimum number suggests an intensive use of forklifts and was considered as the minimum number to justify an on-site survey. Using this minimum criteria, the following Army users were identified:

- Red River Army Depot
Texarkana, Texas
(15 Units)
- Rocky Mountain Arsenal
Denver, Colorado
(7 Units)
- Tooele Army Depot
Tooele, Utah
(5 Units)
- Kansas Army Ammunition Plant
Parsons, Kansas
(4 Units)



Forklift Truck, 4000-Pound-Capacity, Gasoline-Engine-Driven, Solid-Rubber-Tired, Allis-Chalmers Model ACC 45.

Table 1. Characteristics of Allis-Chalmers Forklift, Model ACC 45,
NSN 3930-01-075-4937

Parameter	Military Specification Requirement (MIL-T-52932)	Observed at First Article Test
Lifting speed, with rated load (ft/min)	87	98
Lowering speed, unloaded (ft/min)	70	69.5
Travel speed:		
A. With rated load (mi/h)	9.2	9.2
	Forward	Forward
	9.2	9.1
	Rearward	Rearward
B. Unloaded (mi/h)	9.5	9.5
	Forward	Forward
	9.5	9.6
	Rearward	Rearward
Slope ascension, forward direction:		
With rated load (%)	20	28
Without rated load (%)	20	28
Stability (reference ANSI B56.1)		
Based on 8° backtilt (%)		
Forward stacking	4.5	6.7
Lateral stacking	6.5	9.8/7.4
Forward travel	19.0	23.06
Lateral travel	40	37+
Vehicle noise levels (microphone 6 in. from operator's ear)		
No-load governed speed (dBA)	91	N/A
Torque converter stall (dBA)	83	N/A
Lifting rated load at maximum speed (dBA)	N/A	N/A
Overall length (in.)		
A. Without forks (in.)	N/A	N/A
B. Without forks; with sideshifter installed (in.)	82.25	82.25
Overall width (in.)	40	38

Table 1. Characteristics of Allis-Chalmers Forklift, Model ACC 45,
NSN 3930-075-4937 (Continued)

Military Specification Requirement	Parameter	Military Specification Requirement (MIL-T-52932)	Observed at First Article Test
	Overhead guard height (in.)	83	83.0
	Collapsed mast height (in.)	67.25	67.25
	Maximum fork height (in.)	144	145-1/3
	Free lift height (minimum) (in.)	45	51 1/4
	Wheel base (in.)	50	50
	Mast, maximum tilt (degrees)	3° Forward 8° Rearward	3°30' Forward 7°40' Rearward
	Fork spacing (in.)	8 Maximum 34 Minimum	8 Maximum 34 Minimum
	Fork length (in.)	42	42
	Right-angle turn (maximum) (in.)	152	145 avg
	Ground clearance under mast (minimum) (in.)	3.25	3 1/4
	Maximum carriage width (in.)	38	38
	Drive tire tread width (C_L to C_L) (in.)	32	32
	Steer tire tread (C_L to C_L) (in.)	31.5	32
	Vertical distance from depressed seat to overhead guard (in.)	39	40.5

The original intent was to survey 34 percent of the total fleet (90) of these units, but Tooele Army Depot was found to still have their forklifts in storage and unissued a year after receiving them. Therefore, these could not be surveyed, which changed the percentage of the fleet actually surveyed to 28.

5. Preparation of Survey Questionnaires. Prior to the on-site survey, two questionnaire forms were prepared. The first form, "Army User of Commercial Material-Handling Equipment Questionnaire" (Appendix B), was designed to identify the user, assess his operation, and support an overall assessment of the forklift in his operation. The second form, "Commercial Material-Handling Equipment RAM-D Data Questionnaire" (Appendix C), was designed to record the data necessary to support an objective RAM assessment.

6. On-Site Survey of Army Users. Two survey trips were required to complete the survey. The first trip was to Rocky Mountain Arsenal and Tooele Army Depot, the second trip was to Red River Army Depot and Kansas Army Ammunition Plant. The trip reports for each of these trips are shown in Appendix D.

III. RESULTS

7. Summary of Forklift Use Among Users Surveyed. Table 2 summarizes the general application of this model forklift by the Army users. As expected, because of its size and solid rubber tires, this forklift is used predominantly indoors in warehousing operations involving not only general supplies but also ammunition. This model forklift, almost without exception as confirmed by this survey, is used by non-tactical users and, therefore, is commonly referred to as a TDA (Table of Distribution and Allowances) item. Further, these forklifts generally are used and stored indoors. The Army TDA user maintains his fleet of materials-handling equipment in-house. Generally, the only warranty claims are those involving high-cost items such as transmissions, engines, and hydraulic components. Minor items are repaired in-house to avoid the delay of warranty claims because of the long distance to the dealer. The TDA Army user considered the Integrated Logistics Support (ILS) Package supplied with these forklifts as "adequate" to "good." The ILS package included Allis-Chalmers Commercial Manuals with Supplemental Operating Maintenance and Repair Part Instructions (SOMARPI) prepared by TACOM. It should be noted that all of the Army users surveyed employ civilian equipment operators and mechanics. Therefore, a conclusion concerning the acceptability of this ILS package to tactical users cannot be made.

Table 2. Summary of Army Experience to Date with Allis-Chalmers Model ACC 45 PS Forklift

User	Forklift Used	Date Forklift Received	Percent Indoor Use	No. Shifts	Equip Stored	Maintenance Performed	Warranty Claims	Manuals
Red River Army Depot	In general supply warehousing and ammunition storage operation	Jan-Mar 80	65	1	65% Indoors	In-house	None	Good
Rocky Mountain Arsenal	In demilitarizing ammunition	Dec 79	99	1	Indoors	In-house	1*	Adequate
Tooele Army Depot	In general supply warehousing and ammunition storage operations	Not yet issued						
Kansas Army Ammunition Plant	In manufacturing artillery ammunition	Apr 80	75	1	Indoors	In-house	None required	Good

* Power steering cylinder replaced by local dealer.

8. **Reliability-Availability-Maintainability (RAM) Analysis.** The RAM data collected from each user surveyed are summarized in Table 3. Failures are defined as incidents which required more than 1 hour to correct and could not be postponed to the next scheduled maintenance. Labor time is the maintenance manhours required to correct the failure. Downtime is defined simply as the number of duty clock hours the forklift was out of service. It should be noted that there are data gaps; however, these gaps reflect the actual data transcribed from the individual forklifts maintenance log (DA Form 2407) and on the other available maintenance records associated with each incident. Using the available data, a mean-time-to-repair of 1.03 hours and a mean downtime of 3.8 hours can be calculated. Nine failures (shown in Table 4) were scored by the failure criteria previously presented. Two of these failures relate to the master link failing when the sideshifter is operated with the forks down and the mast at full forward tilt. A fleetwide modification is being made to correct the cause of this failure. Table 5 summarizes the RAM results from this analysis. Cumulative engine hours for each user's fleet and a cumulative total for all users are given. The min/max engine hours accumulated by each user indicates that Red River Army Depot used their vehicles more intensively than the other users surveyed. More failures were also experienced with this increased use. However, the overall fleet MTBF approaches 1900 hours based on the data survey techniques/data analysis just discussed in this report. The fleet also demonstrated an achieved availability (Aa) of 98 percent. Achieved availability (Aa) is defined as total operating time during a given time interval (OT), divided by OT, plus the total active corrective maintenance time during the given time interval (TCM), plus the total active preventive maintenance time during the given time interval (TPM). OT equaled 17068 hours; TCM equaled 15.5 hours; TPM equaled 340 hours (2 hours/100 operating hours).

Table 3. RAM Data Summary from Forklifts Surveyed at Three User Installations

Serial No.	Hourmeter	Failure Incidents	Corrective Maintenance Labor Time (h)	Downtime (h)
Red River Army Depot				
117876	1208	0	0	0
117877	1487	2	1.5*	4
117878	1031	1	1	4
117879	1263	2	2*	Unknown
117880	511	0	0	0
118825	1125	0	0	0
118826	1449	0	0	0
118827	726	0	0	0
119467	848	1	1	2
119468	812	2	2*	4
119469	911	2	4	14
119470	741	0	0	0
119471	1006	1	1*	Unknown
119472	861	1	1*	Unknown
119473	1174	2	2*	Unknown
Rocky Mountain Arsenal				
117866	198	0	0	0
117867	240	0	0	0
117868	140	0	0	0
117869	193	0	0	0
117870	280	1	1*	0
117871	192	0	0	0
117872	206	0	0	0
Kansas Army Ammunition Plant				
119485	210	0	0	0
119486	177	0	0	0
119487	160	0	0	0
119488	175	0	0	0

*Assumed Part or All Corrective Maintenance Time – See Individual Data Sheet in Appendix D for Details.

Table 4. Description of Incidents Scored as Mission Failures

Failure No.	Serial Number	Description of Incident	Corrective Maintenance Time (h)	Corrective Action Taken
1	117870	Steering cylinder leaked	1	Warranty
2	117877	Lift cylinder packing leaked	1	Repaired in-house; tightened
3	117878	Ignition switch failed	1	Replaced
4	117879	Carburetor failed	1	Replaced
5	117879	Ignition switch failed	1	Replaced
6	119467	Lift chain master link broke	1	Replaced
7	119468	Control valve leaked	1	Replaced "O" ring
8	119468	Starter brushes worn	1	Replaced starter
9	119649	Oil line leaked	2	Replaced
10	119649	Intake manifold gasket cracked	2	Replaced
11	119471	Lift cylinder packing leaked	1	Replaced packing
12	119472	Lift chain master link broke	1	Replaced
13	119473	Steering cylinder leaked	1	Replaced
14	119473	Starter/neutral start switch failed	1	Replaced

Table 5. Reliability, Availability, Maintainability Data Summary
From Surveying Army Users of the Allis-Chalmers Forklift Model ACC 45 PS

User	Trucks in Fleet (No.)	Date into Service	Cumulative H on Fleet	Fleet Range		Mission Failures (No.)	Mean Time Between Failures (h)
				min (h)	max (h)		
Red River Army Depot	15	Jan 80	15,154	511	1487	8	1894
Rocky Mountain Arsenal	7	Dec 79	704	140	281	1	1204
Kansas Army Ammunition Plant	4	Apr 80	1,204	160	212	0	704
Cumulative Results			17,068			9	1896

IV. CONCLUSIONS

9. **Conclusions.** It is concluded that:

a. The surveyed forklift, commercial Allis-Chalmers Model ACC 45, NSN 3930-01-075-4937 is used predominantly in TDA organizations, and for the most part it is maintained and operated by civilians.

b. The surveyed forklift is used and stored predominantly indoors, a conclusion attributed to its solid rubber tires.

c. The Army user of the surveyed forklift performs all maintenance in-house with the exception of warranty claims involving high-cost incidents.

d. Warranty claims have been made infrequently and only on high-cost incidents because of the time delay created by distance from nearest dealer.

e. The users surveyed consider the ILS Support Package adequate.

f. The RAM parameters which characterize the surveyed forklifts during their first year of service are as follows:

Mean-Time-Between-Failure – 1896 h

Achieved Availability – 98 percent

Mean-Time-To-Repair – 1.03 h

g. The surveyed forklift is acceptable to its military user at the end of its first year of use.

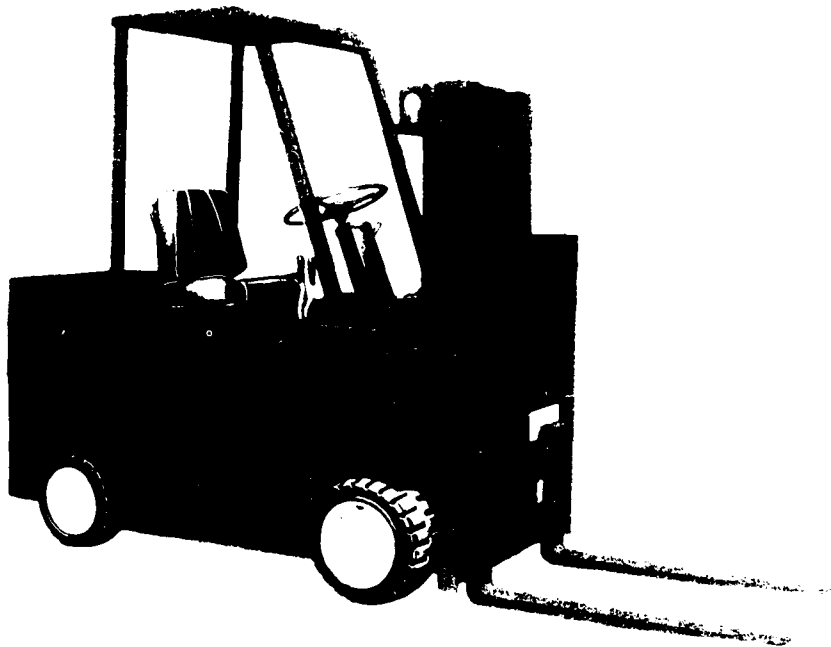
h. The identical trucks should be surveyed periodically to acquire the RAM data required to monitor the fleet's RAM characteristics versus its age. Monitoring the fleet in this manner will support the process of fleet replacement at the most cost-effective point.

APPENDIX A

SPECIFICATIONS FOR THE ALLIS-CHALMERS ACC 45

ACC 45

Cushion Tire Truck
4,500 Lb. Capacity



SPECIFICATIONS



ALLIS-CHALMERS

Published by Equipment Guide Book Division, Niles, ILLINOIS

ACC 45 CUSHION TIRE TRUCK

FEATURES AND SPECIFICATIONS

SAFETY

- Mechanical return-to-neutral
- Computer stability certification available
- Operator's compartment provides all-around visibility

EFFICIENCY

- Excellent service accessibility for maintenance ease
- Allis Chalmers masts feature constant lift speeds
- All operating controls located conveniently for driver



ENGINE HEAVY DUTY INDUSTRIAL TYPE, TELEDYNE CONTINENTAL MODEL F163, 4 cylinder, L head engine Bore 3.44, stroke 4.375, displacement 162 cu. in., three 2.375" diameter replaceable main bearings, compression ratio 7.5:1, 52.5 bhp @ 2400 rpm, maximum torque 135 ft-lbs @ 1400 rpm, stellite type exhaust valves and exhaust valve inserts, roto coil on exhaust valves, positive crankcase ventilation, gear-driven oil pump for full pressure lubrication to main connecting rod, camshaft bearings, tappets, and timing gears. Crankcase capacity 4.5 quarts (with filter), 15 micron spin-on type crankcase oil filter and heavy duty air cleaner. Carburetor is updraft type and engine is equipped with a mechanical governor. LP gas engine also available with same specifications as above.

TRANSMISSIONS POWERSHIFT TRANSMISSION with torque converter has hydraulically-actuated clutch pack and constant mesh gears with 2.63:1 multiplication of input torque by the converter. Two oil-bathed, double-faced direction selector clutches, fully-enclosed gear-type pump, heat exchanger in bottom of radiator, 15 micron spin-on oil filter, 50 mesh sump filter screen. The precision inching control allows accurate load positioning while operating at high engine speed and low wheel speed. Should the operator inadvertently leave his seat with the truck in gear, a return to neutral device will move the directional lever back to neutral. The directional lever is mounted on the left of the steer column.

OIL CLUTCH Two speeds forward and reverse, constant mesh design. The 12" clutch plate is cooled and lubricated by oil sprayed by a gear-type pump. Large 1.5 gal. sump and radiator cooler provides an adequate oil supply and complete oil cooling. Hydraulic circuit protected by a 15 micron, full-flow spin-on filter and sump filter screen. Magnetic drain plug collects loose metal particles. Transmission gears run in their own oil supply. Dual shift lever arrangement with Hi-Lo on left side of steering column and forward reverse on right. Oil clutch transmission manufactured by Allis Chalmers.

FUEL SYSTEMS GASOLINE 6.5 gallon gasoline tank equipped with UL-approved Protecto Seal filler cap. Washable sediment bowl filters gas before delivery to the carburetor. Camshaft driven diaphragm fuel pump. Regular fuel with 91 octane (research method) or better recommended.

LPG Standard tank is ICC 33.5 lb., ICC 43.5 lb. and ASME 50 lb. tanks optionally available. Requires propane meeting NGPA Spec. HD 5 or better.

ELECTRICAL SYSTEM 12 volt electrical system, sealed battery with a cold crank capacity of 275 amps at -18°C for gas and LPG engines, 42 amp alternator with built in voltage regulator, enclosed starting motor, horn and anti-restart starter-ignition switch.

COOLING SYSTEM The cooling system has belt-driven, 5 blade, pusher type steel fan, a radiator shroud to direct air flow and a heavy-duty industrial-type radiator. The radiator has 7 fins per inch and 4 rows of tubes to minimize core clogging, and is protected by a removable open grate rear grill for maximum air flow. The radiator is equipped with a 7 psi capacity. Cooling system capacity is 10 quarts.

DRIVE AXLE Heavy-duty double reduction type, mounted to frame with eight large diameter bolts. Alignment is provided by two sheer-resistant pins mounted in axle housing. First gear reduction through heavy-duty spiral bevel ring and pinion gears. Final reduction occurs at drive wheels through drive axle shaft and internal tooth ring gear greatly reducing torque stress on the drive axle shaft. Two pinion gear-type differential. Rotating parts tapered roller bearing mounted.

BRAKES Self-energizing and self-adjusting shoe-type hydraulic brakes with bonded linings provide high coefficient of friction for sure stops. Braking area is 71 square inches per axle. Self-adjustors maintain pedal travel as linings wear. Mechanical parking brake, mounted to differential input shaft is enclosed expanding shoe-type with 21.75 square inches of lining area. Parking brake, manually applied by adjustable handle, is capable of holding a fully loaded truck on any grade the truck can negotiate.

MASTS Choice of Allis-Chalmers manufactured two-stage extra lift (XL), two-stage high free lift (HFL) or three-stage tri-max (TM). Masts of nested rolled channel, I-beam construction and lifetime sealed upright bearings are angle mounted to absorb longitudinal and lateral thrusts. Single stage chrome-plated, displacement cylinders used on all masts. All masts feature constant lift speeds. Carriages are standard hook-type with six angle-mounted rollers, sealed for life. Built-in lifting eyes for mast installation and removal.

HYDRAULIC SYSTEM Gear-driven gear type high capacity pump, 6.8 gal. drop-out reservoir. Internal baffling self-bleeds off air in the hydraulic system. 5.5" clean-out hole on top of reservoir facilitates cleaning. Sectional control valve for field installation of Allis-Chalmers hydraulic attachments. Fully-filtered system includes: 10 micron replaceable breather cap filter, 50 mesh filter tube filter screen, replaceable 10 micron return line filter and a 100 mesh section line filter. Hydraulic hoses are large diameter, reinforced with steel braid to permit maximum efficiency and less heat buildup in the entire system. Suction line to hydraulic pump is 1.5" diameter steel tubing to eliminate collapsing. Reservoir can supply oil for lifts to 270". Anti-cavitation circuit eliminates tilt cylinder voids.

FRAME All-welded unitized assembly with two 2" x 5" steel main side rail members, 1.25" thick rear and 1.5" thick center cross members. Frame, completely shot blasted and rust-resistant prime coated, supports drive train components and absorbs shock. Weight approximately 1200 lbs.

OVERHEAD GUARD Mounted to the frame for easy removal of counterweight. Constructed of rectangular steel outer members and circular steel cross-members. Meets requirements of ANSI B56.1-1975.

STEERING Full-time power steer with 3.5 turns lock to lock. 17" diameter steering wheel. Cast steel alloy steer axle is trunnion-mounted to frame in self-aligning uniballs, provides about 2" articulation, all pivot points equipped with lubrication fittings. Center point steering reduces steering effort, minimizes tire wear. Steering quadrant is mounted with large diameter tapered roller bearings. Inclined king pins help keep steer wheels in straight line and reduce road shock. King pins mounted in axle with caged needle bearings and Delrin thrust washers.

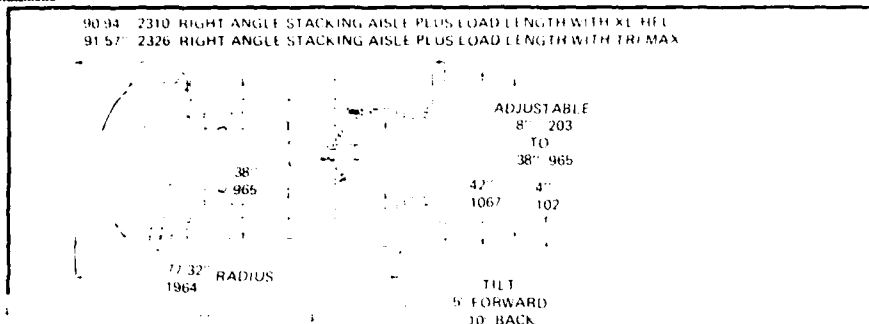
OPERATOR'S COMPARTMENT A 22" cushioned operator's seat with pivoted back and 4" of adjustment. Seat is center positioned for excellent all-around visibility. Instrument panel consists of: fuel gauge, water temperature gauge, oil pressure gauge, ammeter and engine hour meter. Conveniently located foot controls: accelerator pedal, separate brake pedal, clutch pedal or inching pedal. Hand controls are within easy reach of operator. Step provided for easy on-off. Non-skid floor plates and rubber covered foot pedals.

MAINTENANCE ACCESSIBILITY Swing out, lift-off side panels and battery, and swing-up seat deck for easy access to the engine compartment. Solid one-piece, quick removal, drop-down counterweight held in place by single bolt, swings up and away from frame. Provisions in top for counterweight lifting eyes. One piece radiator grill for fast access and removal of radiator. Double universal joint between transmission and drive axle for easy removal of drive train components, assures alignment between transmission and drive axle, absorbs road shock.

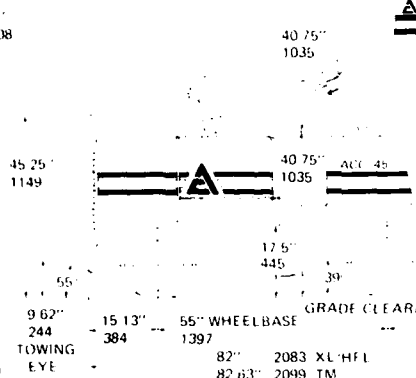
OPERATING DATA									
Capacity @ 24" Load Center		4,500 lbs							
" 609 mm Load Center		2,025 kg							
Turns in intersecting aisles in mm		72 3 1,836		Gradeability		Std Transmission		Powershift Transmission	
				Empty		23%		23%	
				Loaded		26%		30%	
Travel Speed mph km/hr		Transmission		Maximum Drawbar Pull lbs kg					
Empty		8.6 13.8		Empty		2,140 963		2,140 963	
Loaded		8.4 13.5		Loaded		3,045 1,370		3,530 1,589	
Lifting Speed fpm m/min				Weight* lbs kg					
Empty		100 31		Gasoline		7,525 3,386			
Loaded		95 29		LPG		7,575 3,409			
Lowering Speed fpm m/min									
Empty		70 22							
Loaded		70 22		*Add 100 lbs 45 kg for powershift transmission					
NOTE: The performance values listed are nominal values of an engine operating under standard conditions-85°F 29°C and 500 ft 152m altitude. Performance may vary at higher temperature and altitudes and/or as a result of variances in output of production engine and drive train components									



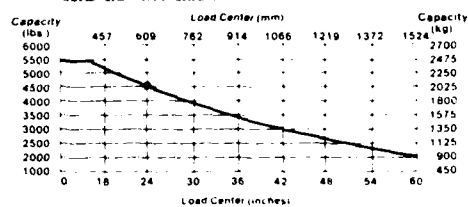
ACC 45 Cushion Tire Truck



83" 2108



LOAD CAPACITY CHART



APPENDIX B

ARMY USER OF COMMERCIAL MATERIAL-HANDLING QUESTIONNAIRE

1. Organization:
2. Location:
3. Type of equipment:
4. Number of units:
5. Contract number:
6. Manufacturer:
7. Model:
8. How long have you had this equipment?
What did it replace?
9. What type of environment is this equipment operating in?
Indoor (%): _____ Outdoor (%): _____
Type of surface? _____
10. What is average engine hours per day?
11. How many shifts?
12. How many days per week?
13. Where is equipment stored?
14. Have any attachments been added?
15. What kind of scheduled maintenance is followed?
16. Where is scheduled maintenance performed?
In-house _____ Dealer _____

17. What is average cost for this?
18. What maintenance problems or failures have occurred on this equipment?
19. Where is unscheduled maintenance performed?
In-house _____ Dealer _____
20. What is average cost for this maintenance? How does this compare with previous equipment maintenance cost?
21. What about availability of parts?
22. How does this compare with previous equipment?
23. Where are these parts requisitioned from?
Army Supply System _____ Dealer _____
24. What is average time to obtain parts?
25. How does this compare with previous equipment?
26. Are there any high mortality parts?
27. How does this compare with previous equipment?
28. What is opinion of the commercial manuals, SOMARPI manuals, and ILS for this item?
29. How do they compare with previous military manuals?
30. Are they readily understandable?
31. What about response to warranty claims?
32. Is any special equipment needed to perform scheduled or unscheduled maintenance action?
33. Have there been any pollution or OSHA problems?
34. What if any difference has been observed with this equipment as opposed to previously procured similar equipment?
35. Do you have a computer printout available for obtaining operational cost for this equipment?

36. Operator consensus:

37. Mechanic consensus:

38. Supply consensus:

39. Do you conduct driver training for this equipment?

40. What mode of transportation was used to ship truck to you?

41. Person contacted:

APPENDIX C

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed

NSN

User Installation

Date of Survey

Manufacturer's Serial Number

Survey Conducted by

USA Number

Initial Hourmeter Reading

Date of Reading

Present Hourmeter Reading

Date of Reading

Note: Was hourmeter changed or inoperative? If yes, what is correction:

Yes _____ No _____

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
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APPENDIX D

TRIP REPORTS



DEPARTMENT OF THE ARMY
US ARMY MOBILITY EQUIPMENT RESEARCH & DEVELOPMENT COMMAND
FORT BELVOIR, VIRGINIA 22060

DRDME- HMW

21 April 1981

SUBJECT: Trip Report, 9-11 March 1981, Red River Army Depot, Texarkana, TX,
and 12-13 March 1981, Kansas Army Ammunition Depot, Parsons, KS.

THRU: Chief, Warehouse and Depot MHE Branch
Chief, Mechanical Equipment Engineering Division

TO: Chief, Mechanical and Construction Equipment Laboratory

1. **Synopsis of Travel.** Surveyed Army users of first-time buy of commercial materials-handling equipment. The item being surveyed is Truck, Lift, Fork, 4K Cap, GED, SRT, Allis-Chalmers Model ACC 45, NSN 3930-01-075-4937.

2. **Personnel Contacted.**

Mr. Bob Narred	MHE Manager	R. R. Army Depot
Mr. Cliff Turner	MHE Shop Chief	R. R. Army Depot
Mr. Larry Cox	MHE Manager	KS Army Ammo Plant
Mr. Clarence Harper	Maintenance Shop Chief	Day-Zimmerman

3. **Discussion:**

a. The Red River Army Depot has 15 of these model lift trucks in operation. They were received in the time between January 1980 to March 1980 and placed in service. The lift trucks are being used in general warehousing and ammunition storage operations on the depot. A review of the Maintenance Request Forms DA2407 was conducted to obtain cost for labor and parts. This information was extracted and placed in the RAM D Forms and the User questionnaire (Incl 1). The lift trucks have accumulated a total of 15,144 operational hours up to the present time. The units have had the usual amount of nuisance type problems, leaks, and loose bolts. Up to the present time no major problems have surfaced.

DRDME-HMW

21 April 1981

SUBJECT: Trip Report, 9-11 March 1981, Red River Army Depot, Texarkana, TX,
and 12-13 March 1981, Kansas Army Ammunition Depot, Parsons, KS

This Depot has a heavy traffic in Milvans. To insure the lift truck has adequate clearance loading and unloading the vans, the following modification was made to the overhead guard. The legs of the overhead guard were shortened by 2 inches to provide more clearance as it enters the Milvan from a loading dock, using a dock plate. This change has been enthusiastically received by the drivers. The Depot is in the process of doing this modification on all lift trucks of this model.

b. Kansas Army Ammunition Plant. This plant has 4 lift trucks of this model in operation. They are being used in a general warehousing and ammunition storage type operations. The plant has been on a limited type production schedule. The lift trucks were received in April 1980 and placed in service. With a limited production schedule, the units have managed to accumulate a total of 690 operational hours. A review of the Maintenance Request Forms was conducted to obtain labor and parts cost. This information was extracted and placed in the RAM D Form and the User questionnaire (Incl 1). Up to the present time, no major problems have surfaced.

One of the minor problems that has surfaced is with the master link on the carriage lift chains. This happens when the forms are lowered completely and the mast is tilted all the way forward and they try to sideshift the forks to the right. When this is done, the sideshift cylinder hits the master link causing damage. This has been corrected by putting a mechanical stop on the side of the carriage to prevent this. There has been a slight degradation in the sideshift capability.

4. **Conclusions.** This survey of Army user of first buy of commercial materials-handling equipment formed the basis for the following conclusions:

a. The equipment was highly acceptable to the users and was considered a much more efficient piece of equipment than the one it replaced (see Incl 1).

b. The deadline for waiting on parts replacement is down considerably. The time frame for getting parts is under 5 days from the dealer.

c. The operators are pleased with the power steering and sideshifting capability. This cuts down on excessive maneuvering for picking up loads. The previous equipment did not have this capability.

DRDME-HMW

21 April 1981

SUBJECT: Trip Report, 9-11 March 1981, Red River Army Depot, Texarkana, TX, and
12-13 March 1981, Kansas Army Ammunition Depot, Parsons, KS

d. The manuals adequately covered all phases of operation and maintenance procedures.

e. The overall consensus of the people interviewed is that the equipment is excellent and meets all the operational requirements of their warehousing and ammunition storage facilities.

f. With the limited amount of operational hours on the equipment at this time, the maintenance costs were the following:

Red River Army Depot: \$0.164 per operational hour.

Kansas Army Ammunition Plant: \$0.744 per operational hour.

5. Recommendations.

a. The equipment has received high ratings from the users and with other information received the equipment receives a good rating. It is recommended the Army continue with the practice of procuring commercial materials-handling equipment.

b. It is also recommended that a followup survey back to the depots and plants surveyed at this time. This will enable us to accurately follow the equipment through the life cycle. This will provide more operational and maintenance data to establish more realistic RAM data.

6. Action Taken.

a. The undersigned contacted manufacturers regarding problems with the master link on the lift chain to resolve the problem.

b. The information collected in (Incl 1) the RAM D and user questionnaires will be combined with previously obtained data and published in a formal report.

1 Incl
as

/s/t/WILLIAM P. CUNNIFFE
Mechanical Engineer Technician
Warehouse & Depot MHE Branch

ARMY USER OF COMMERCIAL MATERIAL-HANDLING QUESTIONNAIRE

1. **Organization:** Kansas Army Ammunition Plant. This is a GOCO operation by Day & Zimmerman.
2. **Location:**
Parsons, Kansas
3. **Type of equipment:**
Truck, Lift, Fork, 4K, GED, SRT, ACC 45, NSN 3930-01-075-4937
4. **Number of units:**
4
5. **Contract number:**
DLA 700-78-C-8339
6. **Manufacturer:**
Allis-Chalmers
7. **Model:**
ACC 45
8. **How long have you had this equipment?** Apr 80
What did it replace? Clark CL-D751970
9. **What type of environment is this equipment operating in?**
Indoor (%): 75 **Outdoor (%)**: 25
Type of surface? Concrete Asphalt
10. **What is average engine hours per day?**
Plant is operative at a reduced production rate.
11. **How many shifts?**
1
12. **How many days per week?**
5
13. **Where is equipment stored?**
Indoor
14. **Have any attachments been added?**
None
15. **What kind of scheduled maintenance is followed?**
TM 38-750
16. **Where is scheduled maintenance performed?**
In-house X **Dealer**

17. What is average cost for this?
32.91 Labor -- Parts 8.17
18. What maintenance problems or failures have occurred on this equipment? No major problems have occurred. The problems are minor: oil leaks, loose bolts, dead battery, adjustments tightened.
19. Where is unscheduled maintenance performed?
In-house X Dealer
20. What is average cost for this maintenance? How does this compare with previous equipment maintenance cost? \$88.17 Labor, \$40.19 Parts yearly. The comparison is good due to the age of the previous equipment.
21. What about availability of parts?
Good. Local dealer.
22. How does this compare with previous equipment?
Same
23. Where are these parts requisitioned from?
Army Supply System Dealer X
24. What is average time to obtain parts?
2-5 days
25. How does this compare with previous equipment?
Same
26. Are there any high mortality parts?
None at this time
27. How does this compare with previous equipment? This is still relatively new equipment. The other equipment was 13 yr old.
28. What is opinion of the commercial manuals, SOMARPI manuals, and ILS for this item?
Good
29. How do they compare with previous military manuals?
Improvement
30. Are they readily understandable?
Yes
31. What about response to warranty claims?
Have not required it
32. Is any special equipment needed to perform scheduled or unscheduled maintenance action?
None
33. Have there been any pollution or OSHA problems?
None
34. What if any difference has been observed with this equipment as opposed to previously procured similar equipment?
Sideshifter, power steering
35. Do you have a computer printout available for obtaining operational cost for this equipment?
No

- 36. **Operator consensus:** Good. Needs another spotlight and better view when forks are picking at second level.
- 37. **Mechanic consensus:**
So far, no problems.
- 38. **Supply consensus:**
Good
- 39. **Do you conduct driver training for this equipment?**
Contractor does
- 40. **What mode of transportation was used to ship truck to you?**
Truck
- 41. **Person contacted:**
Larry Cox, Equip Manager for Government

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K.

NSN 3930-01-075-4937

GED, SRT, ACC 45

User Installation Kansas Army Ammunition Plant 2444

Date of Survey 12 Mar 81

Manufacturer's Serial Number 119487

Survey Conducted by Cunniffe

USA Number WL052P

Initial Hourmeter Reading 002

Date of Reading Apr 80

Present Hourmeter Reading 212

Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction:

Yes No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

User Installation Kansas Army Ammunition 2441

Survey Conducted by Cunniffe

Date of Reading Mar 81

Yes _____ No X

29

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

User Installation Kansas Army Ammunition Plant 2442

Manufacturer's Serial Number 119485

USA Number WLO52J

Date of Reading

Date of Reading

Yes X No

30

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

User Installation Kansas Army Ammunition Plant 2443

Manufacturer's Serial Number 119488

USA Number WL052T

Initial Hourmeter Reading 002

Date of Reading Apr 80

Present Hourmeter Reading 175

Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction:

Yes No **X**

31

ARMY USER OF COMMERCIAL MATERIAL-HANDLING QUESTIONNAIRE

1. Organization:
Red River Army Depot, Texarkana, TX
2. Location:
Texarkana, Texas
3. Type of equipment:
Truck, Lift, Fork, 4K, GED, SRT, ACC 45, NSN 3930-01-075-4937
4. Number of units:
15
5. Contract number:
DSA700-78-C-8339
6. Manufacturer:
Allis-Chalmers, Matteson, IL
7. Model:
ACC 45
8. How long have you had this equipment? Jan-Mar 80
What did it replace? Towmotor Model 461RS, Clark CL-D715970
9. What type of environment is this equipment operating in?
Indoor (%): 65 Outdoor (%): 35
Type of surface? Asphalt-Concrete-Gravel
10. What is average engine hours per day?
11. How many shifts?
1
12. How many days per week?
5
13. Where is equipment stored?
65% inside, 35% outside
14. Have any attachments been added?
None
15. What kind of scheduled maintenance is followed?
TM-38-750
16. Where is scheduled maintenance performed?
In-house X Dealer

17. What is average cost for this?
Labor \$151.91, Parts \$28.85
18. What maintenance problems or failures have occurred on this equipment?
None have appeared to this time.
19. Where is unscheduled maintenance performed?
In-house X Dealer
20. What is average cost for this maintenance? How does this compare with previous equipment maintenance cost?
Labor \$37.41, Parts \$1.42
21. What about availability of parts?
Good
22. How does this compare with previous equipment?
Favorable. Some items took longer.
23. Where are these parts requisitioned from?
Army Supply System X Dealer X Local
24. What is average time to obtain parts?
1-3 days
25. How does this compare with previous equipment?
3-5 days
26. Are there any high mortality parts?
Not at this time
27. How does this compare with previous equipment?
Improvement, especially when the equipment is new.
28. What is opinion of the commercial manuals, SOMARPI manuals, and ILS for this item?
Good
29. How do they compare with previous military manuals?
Improvement
30. Are they readily understandable?
Yes
31. What about response to warranty claims? Do not bother with small items; major items such as engine trans. mast axle would take action. Need to travel long distance for action.
32. Is any special equipment needed to perform scheduled or unscheduled maintenance action?
None
33. Have there been any pollution or OSHA problems?
None
34. What if any difference has been observed with this equipment as opposed to previously procured similar equipment?
Sideshifter vast improvement according to operators
35. Do you have a computer printout available for obtaining operational cost for this equipment?
Yes

- 36. **Operator consensus:**
Good. Like power steering, sideshifter.
- 37. **Mechanic consensus:** Have not had any difficulty with maintenance or repair up to this time. Reel mounting bolts too short.
- 38. **Supply consensus:** If not carried in authorized stock, can go to dealer in a short time.
1-3 days
- 39. **Do you conduct driver training for this equipment?**
Yes
- 40. **What mode of transportation was used to ship truck to you?**
Truck
- 41. **Person contacted:**
Bob Narred, C, MHE Section EMO

Item Surveyed	Truck, Lift, Fork, ACC 45	NSN	3930-01-075-4937
User Installation	Red River Army Depot 4-654	Date of Survey	10 Mar 81
Manufacturer's Serial Number	11876	Survey Conducted by	Cunniffe
USA Number	WLO50T		

Present Hourmeter Reading 1208 **Date of Reading** 10 Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

Item Surveyed	Truck, Lift, Fork, ACC 45	NSN	3930-01-075-4937
User Installation	Red River Army Depot 4-655	Date of Survey	10 Mar 81
Manufacturer's Serial Number	117877	Survey Conducted by	Cunniffe
USA Number	WLO50P		

Present Hourmeter Reading 1487 **Date of Reading** Mar 81

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot Date of Survey 10 Mar 81
4-656

Manufacturer's Serial Number 117878 Survey Conducted by Cunniffe

USA Number WLO50N

Initial Hourmeter Reading 002 Date of Reading Jan 80

Present Hourmeter Reading 1031 Date of Reading Mar 81

Note: Was hourmeter changed or Yes ____ No X
inoperative? If yes, what is correction:

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	Feb 81	979	Replaced ignition switch 4 h downtime, 1 h repair Replaced out of stock, \$5.23 parts

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-02-075-4937

User Installation Red River Army Depot 4-657 Date of Survey 10 Mar 81

Manufacturer's Serial Number 117879 Survey Conducted by Cunniffe

USA Number WLO50P

Initial Hourmeter Reading 001 Date of Reading Jan 80

Present Hourmeter Reading 1263 Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
Semi-annual	Feb 81	1050	Replaced carburetor, 24.15 (1 h to repair assumed) Replaced ignition switch, 5.23 (1 h to repair assumed)

Item Surveyed	Truck, Lift, Fork, ACC 45	NSN	3930-01-075-4937
User Installation	Red River Army Depot 4-658	Date of Survey	10 Mar 81
Manufacturer's Serial Number	117880	Survey Conducted by	Cunniffe
USA Number	WLO50M		

Date of Reading Jan 80

Date of Reading Mar 81

Yes No **X**

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

Item Surveyed	Truck, Lift, Fork, ACC 45	NSN	3930-01-075-4937
User Installation	Red River Army Depot 4-659	Date of Survey	10 Mar 81
Manufacturer's Serial Number	118825	Survey Conducted by	Cunniffe
USA Number	WLO51N		

User Installation	Red River Army Depot	Date of Survey	10 Mar 81
4-659			

Manufacturer's Serial Number 118825 **Survey Conducted by** Cunniffe

USA Number WLO51N

Initial Hourmeter Reading 003 Date of Reading Mar 80

Present Hourmeter Reading 1125 Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes _____ No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

Item Surveyed	Truck, Lift, Fork, ACC 45	NSN	3930-01-075-4937
User Installation	Red River Army Depot 4-660	Date of Survey	10 Mar 81
Manufacturer's Serial Number	118826	Survey Conducted by	Cunniffe
USA Number	WLO51P		

Present Hourmeter Reading 1449 **Date of Reading** Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

Item Surveyed Truck, Lift, Fork, ACC 45 **NSN** 3930-01-075-4937

Manufacturer's Serial Number 118827 **Survey Conducted by** Cuniffe

Initial Hourmeter Reading 002 Date of Reading Mar 80

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot 4-662 Date of Survey 10 Mar 81

Manufacturer's Serial Number 119467 Survey Conducted by Cunniffe

USA Number WLO51R

Initial Hourmeter Reading 002 Date of Reading Mar 80

Present Hourmeter Reading 848 Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	Aug 80	503	Chain broken, replaced master link at carriage; 2 h downtime, 1 h labor

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot 4-663 Date of Survey 10 Mar 81

Manufacturer's Serial Number 119468 Survey Conducted by Cunniffe

USA Number WLO51S

Initial Hourmeter Reading 002 Date of Reading Mar 80

Present Hourmeter Reading 812 Date of Reading Mar 81

Note: Was hourmeter changed or
inoperative? If yes, what is correction: Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	May 80	192	Control valve leaking; replaced "O" ring in sideshifter valve; 4 h down, 1 h labor
Semiannual	Jan 81	748	Starter replaced, bushings worn, rebuilt starter (1 h assumed)

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot 4-664 Date of Survey 10 Mar 81

Manufacturer's Serial Number 119649 Survey Conducted by Cunniffe

USA Number WLO51V

Initial Hourmeter Reading 002 Date of Reading Mar 80

Present Hourmeter Reading 911 Date of Reading Mar 81

Note: Was hourmeter changed or
inoperative? If yes, what is correction: Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	Jan 81	820	Oil line leak at base of lift cylinder, replaced, 2 h labor, 6 h downtime
2	Jan	863	Intake manifold gasket replaced, 2 h labor, 8 h downtime

Item Surveyed	Truck, Lift, Fork, ACC 45	NSN	3930-01-075-4937
User Installation	Red River Army Depot 4-665	Date of Survey	10 Mar 81
Manufacturer's Serial Number	119470	Survey Conducted by	Cunniffe
USA Number	WLO51Z		

Present Hourmeter Reading 741 Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes _____ No X

[illegible]

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot Date of Survey 10 Mar 81
4-666

Manufacturer's Serial Number 119471 Survey Conducted by Cunniffe

USA Number WLO52B

Initial Hourmeter Reading 002 Date of Reading Mar 80

Present Hourmeter Reading 1006 Date of Reading Mar 81

Note: Was hourmeter changed or Yes ____ No X
inoperative? If yes, what is correction:

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
Semiannual	Oct 80	812	Replaced lift cylinder packing (1 h assumed) \$12.69

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot 4-667 Date of Survey 10 Mar 81

Manufacturer's Serial Number 119472 Survey Conducted by Cunniffe

USA Number WLO52A

Initial Hourmeter Reading 003 Date of Reading Mar 80

Present Hourmeter Reading 861 Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	Feb 81	766	Master chain link at carriage replaced (1 h assumed)

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, ACC 45 NSN 3930-01-075-4937

User Installation Red River Army Depot 4-668 Date of Survey 10 Mar 81

Manufacturer's Serial Number 119473 Survey Conducted by Cunniffe

USA Number WLO51X

Initial Hourmeter Reading 001 Date of Reading Mar 80

Present Hourmeter Reading 1174 Date of Reading Mar 81

Note: Was hourmeter changed or inoperative? If yes, what is correction: Yes _____ No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	Oct 80	544	Replaced steering cylinder, bad leak parts 50.74, labor 23.44 (1 h assumed)
2 Semiannual	Feb 81		Neutral start switch replaced 4.90 Starter replaced 84.94 (1 h assumed)



DEPARTMENT OF THE ARMY
US ARMY MOBILITY EQUIPMENT RESEARCH & DEVELOPMENT COMMAND
FORT BELVOIR, VIRGINIA 22060

ORDME HMW

2 January 1981

SUBJECT: Trip Report 1-3 December 1980 to Rocky Mountain Arsenal and 3-5 December 1980 to Tooele Army Depot

THRU Chief, Warehouse and Depot, MHE Branch
Chief, Mechanical Equipment Engineering Division

TO Chief, Mechanical & Construction Equipment Laboratory

1. **Synopsis of Travel:** Survey of Army users of first-time procurement of Commercial Materials-Handling Equipment (MHE). Item is Truck, Lift, Fork, 4K Capacity, Gasoline-Engine-Driven, Solid-Rubber-Tired, NSN 3930-01-075-4937.

2. **Personnel Contacted:**

Bob Boynton	Equipment Manager	Rocky Mountain Arsenal
Sam Villani	Equipment Specialist	Rocky Mountain Arsenal
Wald. Haas	Maint Shop Supervisor	Rocky Mountain Arsenal
B. Johnson	Shop Supervisor	Tooele Army Depot
B. Wagstaff	Equipment Specialist	Tooele Army Depot
L. Penor	Equipment Manager	Tooele Army Depot
R. Bradigan	Equipment Specialist	Tooele Army Depot

3. **Discussion:**

a. The TACOM Item Manager (Ken Kish) for Truck, Lift, Fork, Gasoline-Engine-Driven, Solid-Rubber-Tired, 4000-lb-Capacity, Allis-Chalmers Model ACC 45, NSN 3930-01-075-4937 was contacted to identify users of this item. Two of the recommended candidates for a user survey were Rocky Mountain Arsenal and Tooele Army Depot. The lift truck surveyed was from the first buy of Materials-Handling Equipment (MHE) under the new concept of CMHE. Ninety of these units were procured under Contract DLA700-78-C-8339 from Allis-Chalmers Industrial Truck Division.

b. Rocky Mountain Arsenal has seven of these lift trucks operating in their general warehousing facilities. The lift trucks have been in service since Dec 79 and have been used an average of 205 hours. Only one failure, a leaking power steering cylinder, has occurred and it was replaced under warranty. Parts availability for routine maintenance was found to be significantly shorter using the local dealer rather than the Army Supply System. Both the operators' and mechanics' comments, when taken in total, indicate that this item of CMHE is satisfactory. The survey sheet (Incl 1) contains additional data gathered during this on-site survey.

DRDME-HMW

2 January 1981

SUBJECT: Trip Report 1-3 December 1980 to Rocky Mountain Arsenal and 3-5 December 1980 to Tooele Army Depot

c. Tooele Army Depot (TAD) according to the information obtained from the TACOM Item Manager prior to the trip was operating 10 lift trucks. However, upon arrival at Tooele this was found not to be true. Rather 5 of these lift trucks, unused, were found in the Depot Inventory for Issue. The remaining 5 units could not be located. Therefore, a survey was not possible at Tooele on these lift trucks.

While trying to locate the 10 lift trucks, the writer observed a section in the warehouse with 40 to 50 lift trucks. These lift trucks had been procured on 1971 and 1976 contracts and had never been issued.

4. Conclusions:

a. The trip objective of collecting data to support an analysis of CMHE was satisfied. The data will be aggregated with data from additional trips and presented in a final report.

b. Survey data from Rocky Mountain Arsenal indicate their CMHE satisfies both the operators and mechanics.

c. Although a survey of CHME was impossible at Tooele, finding CHME trucks in storage instead of in use indicates that one aspect of the Commercial Commodity Acquisition Program is not working as originally conceived. Namely, delivery from manufacturer to user and full use of warranty.

d. A quantity of old (4-9 years), unused, unissued MHE is stored at Tooele.

5. Recommendations:

a. Complete survey as planned in FY 81 commercial equipment program for MHE.

b. Investigate the issue of CMHE to depot in lieu of a user.

c. Determine the quantity and mix of the old, unused and unissued MHE in storage within the Army (majority is probably stored at Tooele, Letterkenny, and New Cumberland Army Depots).

6. Action Taken: None.

1 Incl
as

/s/t/WILLIAM P. CUNNIFFE
Engineer Technician

ARMY USER OF COMMERCIAL MATERIAL-HANDLING QUESTIONNAIRE

1. Organization:
Rocky Mountain Arsenal
2. Location:
Commerce City, Colorado
3. Type of equipment:
Truck, Lift, Fork, 4K GED SRT Allis-Chalmers NSN 3930-01-075-4937
4. Number of units:
7
5. Contract number:
DLA700-78-C-8339
6. Manufacturer:
Allis-Chalmers
7. Model:
ACC 45
8. How long have you had this equipment? 1 year, Dec 79
What did it replace? Clark Model C4013 1615159 & 1615160
9. What type of environment is this equipment operating in?
Indoor (%): 99% Outdoor (%): 1%
Type of surface? Concrete
10. What is average engine hours per day?
1.5-2.5
11. How many shifts?
1
12. How many days per week?
5
13. Where is equipment stored?
Indoors
14. Have any attachments been added?
No
15. What kind of scheduled maintenance is followed?
Quarterly or 50 h whichever comes first
16. Where is scheduled maintenance performed?
In-house X Dealer

17. What is average cost for this? \$45.00 for regular scheduled preventative maintenance. This is average labor & material cost for normal maintenance.
18. What maintenance problems or failures have occurred on this equipment?
Power steering cylinder leaked and was replaced by the dealer under warranty.
19. Where is unscheduled maintenance performed?
In-house X Dealer
20. What is average cost for this maintenance? How does this compare with previous equipment maintenance cost?
Insufficient data available at this time to compute cost.
21. What about availability of parts?
Parts are readily available from local dealer.
22. How does this compare with previous equipment?
Parts are now available in a shorter time.
23. Where are these parts requisitioned from?
Army Supply System Dealer X
24. What is average time to obtain parts?
Scheduled maintenance parts are available within 2-3 days from local dealer.
25. How does this compare with previous equipment?
This compares to 3-4 weeks under the old Army Supply System.
26. Are there any high mortality parts?
At this time, no high mortality parts have surfaced.
27. How does this compare with previous equipment?
Not enough data has been accumulated to make any findings.
28. What is opinion of the commercial manuals, SOMARPI manuals, and ILS for this item?
The operators and mechanics find the manuals adequate.
29. How do they compare with previous military manuals?
Comparable
30. Are they readily understandable?
No difficulties have shown up.
31. What about response to warranty claims?
Good. Responded readily to user request.
32. Is any special equipment needed to perform scheduled or unscheduled maintenance action?
No
33. Have there been any pollution or OSHA problems?
None have been identified.
34. What if any difference has been observed with this equipment as opposed to previously procured similar equipment? Slightly less visibility when travelling forward in the empty condition. Operators are delighted with the sideshift capability.
35. Do you have a computer printout available for obtaining operational cost for this equipment?
Not at this time. The Arsenal is in the process of converting to a new system.

36. Operator consensus:
Good. The sideshift capability of the truck makes stocking easier.
37. Mechanic consensus:
Good. The mechanics have not experienced any problems with maintenance & repair of the item.
38. Supply consensus:
Good. The local dealer maintains a good stock of parts and delivery was in 2-3 days.
39. Do you conduct driver training for this equipment?
No
40. What mode of transportation was used to ship truck to you?
Railroad
41. Person contacted:
W. Haas, Maint. Shop Supervisor
B. Boynton, Equipment Manager
S. Villani, Equipment Specialist

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

NSN 3930-01-075-4937

User Installation Rocky Mountain Arsenal
Denver, Colorado

Date of Survey 2 Dec 80

Manufacturer's Serial Number 117866

Survey Conducted by Cunniffe

USA Number

Initial Hourmeter Reading 002

Date of Reading 15 Dec 79

Present Hourmeter Reading 198

Date of Reading 2 Dec 80

Note: Was hourmeter changed or
inoperative? If yes, what is correction:

Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
			None

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K

NSN 3930-01-075-4937

GED, SRT ACC 45

User Installation Rocky Mountain Arsenal
Denver, Colorado

Date of Survey 2 Dec 80

Manufacturer's Serial Number 117868

Survey Conducted by Cunniffe

USA Number

Initial Hourmeter Reading 003

Date of Reading 15 Dec 79

Present Hourmeter Reading 140

Date of Reading 2 Dec 80

Note: Was hourmeter changed or
inoperative? If yes, what is correction:

Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
			None

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

NSN 3930-01-075-4937

User Installation Rocky Mountain Arsenal

Date of Survey 2 Dec 80

Manufacturer's Serial Number 117869

Survey Conducted by Cunniffe

USA Number

Initial Hourmeter Reading 001

Date of Reading 15 Dec 79

Present Hourmeter Reading 193

Date of Reading 2 Dec 80

Note: Was hourmeter changed or
inoperative? If yes, what is correction:

Yes _____ No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
			None

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

NSN 3930-01-075-4937

User Installation Rocky Mountain Arsenal

Date of Survey 2 Dec 80

Manufacturer's Serial Number 117870

Survey Conducted by Cunniffe

USA Number

Initial Hourmeter Reading 003.5

Date of Reading 15 Dec 79

Present Hourmeter Reading 281

Date of Reading 2 Dec 80

Note: Was hourmeter changed or
inoperative? If yes, what is correction:

Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
1	9 Sep 80	163	Packing on steering cylinder was leaking Replaced by dealer under warranty (1 h assumed)

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K,
SRT, ACC 45

NSN 3930-01-075-4937

User Installation Rocky Mountain Arsenal

Date of Survey 2 Dec 80

Manufacturer's Serial Number 117871

Survey Conducted by Cunniffe

USA Number

Initial Hourmeter Reading 004

Date of Reading 15 Dec 79

Present Hourmeter Reading 192

Date of Reading 2 Dec 80

Note: Was hourmeter changed or
inoperative? If yes, what is correction:

Yes ☐ No ☒

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
			None

Item Surveyed Truck, Lift, Fork, 4K
GED, SRT, ACC 45
User Installation Rocky Mountain Arsenal
 Denver, Colorado
Manufacturer's Serial Number 117867

Date of Survey 2 Dec 80

Survey Conducted by Cunniffe

Initial Hourmeter Reading 001.5

Date of Reading 15 Dec 79

Present Hourmeter Reading 240.0

Date of Reading 2 Dec 80

Note: Was hourmeter changed or inoperative? If yes, what is correction:

Yes No X

60

COMMERCIAL MATERIAL-HANDLING EQUIPMENT RAM-D DATA QUESTIONNAIRE

Item Surveyed Truck, Lift, Fork, 4K,
GED, SRT, ACC 45

NSN 3930-01-075-4937

User Installation Rocky Mountain Arsenal

Date of Survey 2 Dec 80

Manufacturer's Serial Number 117872

Survey Conducted by Cunniffe

USA Number

Initial Hourmeter Reading 004

Date of Reading 15 Dec 79

Present Hourmeter Reading 206

Date of Reading 2 Dec 80

Note: Was hourmeter changed or
inoperative? If yes, what is correction:

Yes _____ No X

Failure No.	Date	Hourmeter Reading	Describe failure (what happened, who repaired, cost to repair, total downtime, etc.)
			None

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